35. The network of claim 28,

wherein each of said input switches, or each of said output switches, or each of said middle switches further recursively comprise one or more networks.

36. A method for setting up one or more multicast connections in a network having an input stage having $n_1 * r_1$ inlet links and r_1 input switches, an output stage having $n_2 * r_2$ outlet links and r_2 output switches, and a middle stage having m middle switches, where each middle switch is connected to each of said r_1 input switches through r_1 first internal links and each middle switch further comprising at least one link connected to at most d said output switches for a total of at least d second internal links, wherein $1 \le d \le r_2$, said method comprising :

receiving a multicast connection at said input stage;

fanning out said multicast connection in said input stage into at most three middle switches to set up said multicast connection to a plurality of output switches among said r_2 output switches of said multicast connection, wherein said plurality of output switches are specified as destinations of said multicast connection, wherein first internal links from said input switch to said at most three middle switches and second internal links to said destinations from said at most three middle switches are available.

37. A method of claim 36 wherein said act of fanning out is performed without changing any existing connection to pass through another middle switch.

38. A method of claim 36 wherein said act of fanning out is performed recursively.

39. A method for setting up one or more multicast connections in a network having an input stage having $n_1 * r_1$ inlet links and r_1 input switches, an output stage having $n_2 * r_2$ outlet links and r_2 output switches, and a middle stage having m middle switches, where each middle switch is connected to each of said r_1 input switches through r_1 first internal links and each middle switch further comprising at least one link connected to at most d said output switches for a total of at least d second internal links, wherein $1 \le d \le r_2$, said method comprising :

checking if all the destination output switches of said multicast connection have available second internal links from at most three middle switches.

40. The method of claim 39 further comprising:

checking if the input switch of said multicast connection has available first internal links to at most said three middle switches.

41. The method of claim 39 further comprising:

repeating said checkings of available second internal links to all said destination output switches for all the other combinations of at most three middle switches.

42. The method of claim 39 further comprising:

setting up each of said connection from its said input switch to its said output switches through at most said three middle switches, selected by said checkings, by fanning out said multicast connection in its said input switch into at most said three middle stage switches;

43. A method of claim 39 wherein any of said acts of checking and setting up are performed recursively.

44. A method of setting up a multicast connection through a three-stage network, said method comprising:

fanning out at most three times in an initial stage.

45. The method of claim 44 further comprising:

fanning out any number of times in each of the remaining stages,

wherein said three-stage network includes said remaining stages and said initial stage.

46. The method of claim 44 further comprising:

repeating said acts of fanning out with a plurality of portions of each said stages.

47. The method of claim 44 further comprising:

recursively performing said act of fanning out.

48. The method of claim 44 wherein:

a remaining stage immediately following said initial stage comprises internal links that are at least three times the total number of inlet links of said initial stage.

49. The method of claim 44 wherein:

said initial stage comprises a plurality of first switches, and plurality of inlet links connected to each said first switch; and

a remaining stage immediately following said initial stage comprises a plurality of second switches, that are at least three times the number of inlet links of each first switch and each second switch comprises a plurality of first internal links at least equal in number to the number of first switches in said initial stage.

50. A network comprising:

an input stage comprising N_1 or $n_1 * r_1$ inlet links and r_1 input switches and n_1 inlet links for each of said r_1 input switches, and $N_1 = n_1 * r_1$, said n_1 inlet links for receiving connection connections;

an output stage comprising N_2 or $n_2 * r_2$ outlet links and r_2 output switches and n_2 outlet links for each of said r_2 output switches, and $N_2 = n_2 * r_2$, said n_2 outlet links for transmitting said received connections; and

a middle stage having m middle switches, and each middle switch has at least one link connected to each input switch for a total of at least r_1 first internal links and each middle switch further comprising at least one link connected to at most d output switches for a total of at least d second internal links, wherein $1 \leq d \leq r_2$,

said initial stage having multicast connections with a fan-out of at most three.

51. The network of claim 50 further comprising:

said multicast connections having a fan-out of one or more in said middle stage.

52. The network of claim 50 further comprising: